STUDY OF TRANSITION METAL COMPLEXES OF SOME BIOACTIVE ORTHO HYDROXY CHALCONES AND THEIR DERIVATIVES

A synopsis submitted to

SWAMI RAMANAND TEERTH MARATHWADA UNIVERSITY, NANDED

For the Registration of
DOCTOR OF PHILOSOPHY

In the Subject
CHEMISTRY
Under the Faculty of Science& Technology

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AUGUST2023

ABSTRACT

STUDY OF TRANSITION METAL COMPLEXES OF SOME BIOACTIVE ORTHO HYDROXY CHALCONES AND THEIR DERIVATIVES

Introduction:

The design of new metal-based chemotherapeutic agent is an emerging research area of inorganic medicinal chemistry. It is well known that medicinal inorganic chemistry is a multidisciplinary field comprises of chemistry, pharmacology, toxicology and biochemistry. The medicinal chemists have focused on design and synthesis of new metal-based molecules with improved biological activity, better selectivity, lower toxicity and multiple role of mechanistic action to overcome the clinical problems of existing drugs in the market due to its side effects. The literature survey demonstrated that the metal complexes are growth inhibitors of microbes and have been extensively studied *in vitro* and *in vivo*.

After the discovery of cisplatin [cis-diamminedichloroplatinum(II)], there has been a rapid developments in inorganic research to find out new and more efficacious metal-based chemotherapeutic drugs. The researchers are motivated and search for new metallic species with improved biological applications. Among the metal ions, copper, nickel, cobalt and zinc complexes have proved to be an excellent candidate. Copper complexes have shown remarkable efficiency in antioxidant, DNA-binding and anticancer studies. There is a great deal of interest in the synthesis and characterization of transition metal chelates of hydroxyl chalcones and their heterocyclic compounds, in particular pyrazoline derivatives.

Literature Survey:

Chalcones have been used as ligands in the formation of metal complexes. They can act as monodentate, bidentate or polydentate species towards the metal complexes depend on the number of donor atoms present the compound. If there is one or more donor atoms present near to the carbonyl group, the chalcones can form chelate metal complexes. Chalcone derivatives can form complexes with different metal ions due to their good synthetic flexibility, selectivity and sensitivity towards the central metal atom. They are able to form complexes with Mn(II), Co(II), Ni(II), Cu(II), Zn(II), Cd(II), Ru(III) and Rh(III).

In recent years, the metal ions play important role in living systems and various transition metal complexes have been used as medicinal compounds. Metalcomplexes possess great diversity in their action like anticancer, anti-inflammatory, antimycotic, anti-alzheimer, anti-oxidant, anti-microbial and anti-diabetic properties.

Pyrazoline derivatives are synthetic structural lead molecules of extreme importance for the researchers because of their wide range of biological and pharmaceutical properties such as analgesic, antipyretic and antiandrogenic activities. Pyrazolines have possessed antidepressant, anti-inflammatory and antirheumatic activities. After the pioneering work of Fischer and Knoevenagel in the late nineteenth century, the reaction of α,β-unsaturated aldehydes and ketones and then with hydrazines became one of the most popular methods for the preparation of 2-pyrazolines. 2-Pyrazolines have potential antioxidative effects, capable of preventing oxidative damage as well as clastogenic effects. As a result, numerous substituted 2-pyrazolines have been synthesized.

In recent years, the success of pyrazole moiety as COX-2 inhibitor has highlighted the importance of this heterocycles in medicinal chemistry. A systematic investigation of this class of compounds revealed that pyrazole containing pharmacophore moiety (imidazole) plays an important

role in medicinal chemistry. The dominance of pyrazole core in biologically active molecules has stimulated the need for well-designed and efficient ways to make heterocyclic lead for therapeutic purpose.

According to a literature survey, it was noted that little research work has been carried out on pyrazolines carrying naphthyl/substituted naphthyl groups. Till now, there are no reports on the development of pyrazoline based ligands and their transition metal complexes as antituberculosis agents.

In view of these facts, we herein plan the synthesis and characterization of hydroxyl chalcones and pyrazoline based ligands and their copper(II), nickel(II), cobalt(II) and zinc(II) complexes. Further, the ligands and their metal complexes will be subjected to antioxidant and antitubercular activities.

Objectives

Theobjectives oftheproposedstudy are:

- TosynthesisenewbioactiveHydroxy Chalcones, Pyrazolines and their Metal Complexderivatives.
- Toevaluatethesenewlysynthesizedderivativesfortheirantibacterial,antioxidant and anti tubercular properties.

Proposed Work

1) First the literature survey will be done.
2) Synthesis of Bioactive α, β-unsaturated carbonyl compounds (o Hydroxy Chalcones)
3) Synthesis of N-Hydro-2-Pyrazolines and their characterization
4) Synthesis of N-Acetyl-2-Pyrazolines and their characterization
5) Synthesis of Metal Complexesand their characterization
6) Study of Antibacterial, anti oxidant and anti Tubercular activities of Metal Complexes synthesised

Methodology

- Onthe basisofpredictedproperties,more activeHydroxy chalcones, Pyrazoline and Metal Complex moleculeswillbesynthesized byadopting simpleenvironmentfriendlyroutes.
- Modificationsinthestructureofexistingdrugintermediateswillbedonef orenhancementintheir activities.
- Thesynthesisedcompounds willbepurifiedbycolumn/HPLchromatography.
- TheirstructurecharacterisationwillbeconfirmedbyIR,^{1}HNMR,MassSp ectralAnalysis, TGA, DTA studies.
- Selectednewcompoundswillbescreened*in-vitro*forantifungal,antibacterial,antioxidant, antitubercularproperties.
- Results,DiscussionandAnalysis(Conclusion)

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Conclusion

In the proposed work attempts will be made to rationalize the Quantitative structure–activity relationship of metal complexes of hydroxyl chalcones and pyrazoline scaffold for antimycobacterial agent. The design and synthetic approach will be concentrated on the development of metal complexes of hydroxyl chalcones and pyrazoline analogues with improved anti-tuberculosis activity.

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